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10/749,637	12/31/2003	Barrett E. Cole	H0005547-0760(1100.122910	9413

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EXAMINER

MILLER, DANIEL H

ART UNIT

PAPER NUMBER

1775

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/749,637

Applicant(s)

COLE ET AL.

Examiner

Daniel Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10/12/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 17-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-16 and 26-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/12/2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 10-16 and 26-34 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 10, 13 and 26 recite a catalytic island exposed to a temperature sufficient "to form a ball having a diameter similar to a thickness." A thickness of what? Correction required.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 26-28, 30, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al (U.S. 2004/01619129).
3. Regarding claim 26, Son teaches an insulating substrate with a first material or passivation layer (430 barrier layer) deposited on a substrate (401) and an island of second material (510 catalyst) formed on the first material (figure 8). Regarding claim 27, the first material can be titanium nitride (0041). Regarding claim 30, the second material is nickel, cobalt or iron (0042 and 0045). Regarding claim 33, the substrate can be silicon, quartz, glass or ceramic (0039). Regarding claim 34, the island (catalyst layer) comprises carbon nanotubes extended from the island (figure 9 and 10 and 0048). The island of catalyst material is grown through a via that runs through the first layer (see figures).
4. The reference is silent as to the catalyst island is formed by exposing catalytic material to a temperature sufficient to form a ball having a diameter similar to a thickness.
5. It is noted that the process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught. Regarding the ball shape, It has been held that the configuration ...(is) a matter of choice which a person of ordinary skill

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in the art would have found obvious absent persuasive evidence that the particular configuration (as) claimed ...(is) significant (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)). Applicant has made no showing of criticality or significance with respect to the shape of the catalyst material nor has he demonstrated a functional difference.

Therefore, the shape is merely considered a design choice.

6. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the catalyst layer in a variety of configurations as a matter of design choice.

7. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (U.S. 6,339,281B2).

8. Lee teaches an insulating substrate (1) with a first material (passivation layer) (2) deposited on the substrate and an island of catalyst (second) material (9) formed on the first material (figure 2H and column 4 Line 2-10, 28-35) are grown through an aperture (via) (see figures).

9. The reference is silent as to the catalyst island is formed by exposing catalytic material to a temperature sufficient to form a ball having a diameter similar to a thickness.

10. It is noted that the process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught. Regarding the ball shape, It has been held that the configuration ...(is) a matter of choice which a person of ordinary skill

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in the art would have found obvious absent persuasive evidence that the particular configuration (as) claimed ...(is) significant (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)). Applicant has made no showing of criticality or significance with respect to the shape of the catalyst material nor has he demonstrated a functional difference.

Therefore, the shape is merely considered a design choice.

11. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the catalyst layer in a variety of configurations as a matter of design choice.

12. Claims 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (U.S. 6,890,233 B2).

13. Hsu teaches an insulating substrate (column 6 line 20-30) with a (passivation layer) transition metal nitride conductive layer (column 7 line 45-55). Then an adhesion second layer is added. Regarding claim 27, the first layer can be HfN or TiN (column 7 line 48-55).

14. The reference is silent as to the catalyst island is formed by exposing catalytic material to a temperature sufficient to form a ball having a diameter similar to a thickness.

15. It is noted that the process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught. Regarding the ball shape, It has been held that the configuration ...(is) a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular

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configuration (as) claimed ...(is) significant (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)). Applicant has made no showing of criticality or significance with respect to the shape of the catalyst material nor has he demonstrated a functional difference. Therefore, the shape is merely considered a design choice.

16. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the catalyst layer in a variety of configurations as a matter of design choice.

17. Claims 10-16, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al (U.S. 2004/01619129) in view of Shen et al U.S. 6,143,474 further in view of Zenke et al (U.S. 5,187,557).

18. Regarding claim 10, Son, discussed above, further discloses a resistor layer (typically an oxide layer, see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2) followed by a titanium nitride layer (barrier layer claim 1) and then covered with a passivation layer (# 460 figure 8). However, the reference is silent as to the presence of HfN and the composition of the resistor layer.

19. Zenke discloses that titanium nitride and hafnium nitride are routinely interchangeable in semiconductor applications (see claim 4 Zenke).

20. Therefore, as it is taught by Zenke that a HfN and TiN layers are interchangeable, it would be obvious to substitute HfN for TiN since the two are interchangeable within the technology. However, Zenke is silent as to the presence of a resistor or oxide layer.

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21. It would have further been obvious to use a conductive oxide layer because Shen teaches that a resistor layer is an oxide layer (see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2).

22. Son further discloses a hole through the passivation layer to the TiN layer where the catalytic island is formed (510 of figure 8-10). The catalytic layer is in contact with the TiN layer. Regarding claims 11-16, carbon nanotubes are grown on the catalytic island as discussed above using a plasma deposition and etching process with temperatures ranging from 500 C to 900 C. However the reference teaches TiN and is silent as to a HfN layer. Claims 11, 12, 15, 16 are considered intended use only and do not structurally define over the prior art. A carbon nanotube is not positively recited in the claims. Regarding claims 28-29, it would be obvious to make the material stoichiometric or non-stoichiometric absent a showing of criticality with respect to this feature.

23. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al in view of Gossen (U.S. 5,710,656) or Liu et al (U.S. 6,268,615B1).

24. Son, discussed above, discloses an electron-emitting device used to display an image using visible light (see 0003) but is silent as to the use of ITO as a first layer.

25. Goossen and Liu both teach a first layer having ITO. The layers are used because of their applicability in optical applications such as photodetectors (see Liu

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abstract). The ITO coating having a unique reaction to light (see Liu et al claims 8 and 9).

26. As it is taught by Goose and Liu that it is commonly known to use a ITO layer for optical applications such as photodetectors it would have been obvious to use an ITO oxide first layer if using the device for similar optical applications like Goosen and Liu because they have a unitary purpose.

27. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al (U.S. 2004/01619129) in view of Shen et al U.S. 6,143,474.

28. Son, discussed above, is silent as to the first material being a protective oxide.

29. Shen teaches a resistor layer is typically an oxide layer; see Shen et al U.S. 6,143,474 for description of oxidized substrate figure 2.

30. As it is taught by Shen that it is known to form a resistor layer as a conductive oxide, it would have been obvious to use a conductive oxide since it is typical and common in the art.

### ***Response to Arguments***

31. Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.

32. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by

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combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, regarding claim 31, as it is taught by Goose and Liu that it is commonly known to use a ITO layer for optical applications such as photodetectors it would have been obvious to use an ITO oxide first layer if using the device for similar optical applications like Goosen and Liu because they have a unitary purpose.

33. Applicant argues that the language "in contact" means no intervening layers; the examiner respectfully disagrees. The addition of the language "directly" or the negative limitation of "without intervening layers" would accomplish applicant's intended purpose, but the current language allows for the interpretation that intervening layers can exist as long as the two are in contact or otherwise connected.

34. Regarding claim 31, as it is taught by Shen that it is known to form a resistor layer as a conductive oxide, it would have been obvious to use a conductive oxide since it is typical and common in the art.

35. Regarding the rejection over Lee, It is noted that the process limitations are not indicative of patentability of a claim to the product wherein the product is otherwise taught. Regarding the ball shape, It has been held that the configuration ...(is) a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration (as) claimed ...(is) significant (*In re*

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Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)). Applicant has made no showing of criticality or significance with respect to the shape of the catalyst material nor has he demonstrated a functional difference. Therefore, the shape is merely considered a design choice. The catalytic material of Lee can otherwise be considered an island.

36. Regarding the rejection over Zenke, Applicant argues there is no motivation to combine. The examiner disagrees, the Zenke reference is used to teach that HfN is interchangeable in semiconductors with TiN (Son only teaches TiN) and therefore would be obvious to substitute. Son also recites a resistor layer, which is known in the art to typically be an oxide layer (as evidenced by Shen et al U.S. 6,143,474).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571) 272-1534. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Miller



JENNIFER MCNEIL  
SUPERVISORY PATENT EXAMINER

10/30/06